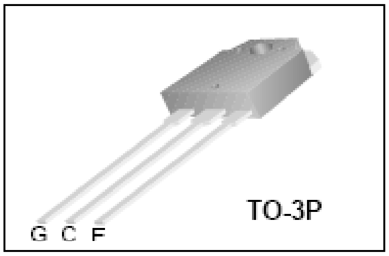
Silicon FS Planar IGBT

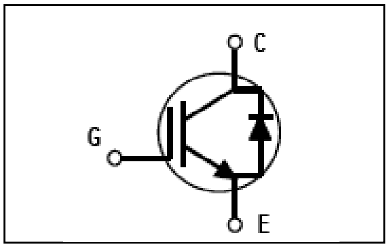
BT15N120ANF

General Description：

Using HUAJING's proprietary trench design and advanced FS(field stop) technology, the 1200V Trench FS-IGBT offers superior conduction and switching performances, high avalanche ruggedness.

V_{CES}	**1200**	**V**
I_C	**25**	**A**
P_{tot} （T_C=25℃）	**186**	**W**
$V_{CE(SAT)}$	**2.2**	**V**





Features：

- Trench FS Technology, Positive temperature coefficient
- Low saturation voltage: $V_{CE(sat)}$, typ = 2.2V
  @ I_C = 15A and T_C = 25°C
- Extremely enhanced avalanche capability

Applications：

Power switch circuit of induction cooker(IH).

Absolute Maximum Ratings

（Tc= 25℃ unless otherwise specified）：

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate- Emitter Voltage	±20	V
I_C	Collector Current	30	A
	Collector Current @TC = 100 °C	15	A
$I_{CM}{}^{a1}$	Pulsed Collector Current	45	A
I_F	Diode Continuous Forward Current @TC = 100 °C	15	A
I_{FM}	Diode Maximum Forward Current	45	A
P_D	Power Dissipation @ TC = 25°C	186	W
	Power Dissipation @TC = 100 °C	74	W
T_J，T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	℃
T_L	Maximum Temperature for Soldering	300	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction to case for IGBT	--	0.67	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to case for Diode	--	2.88	℃/W

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	--	40	℃/W

Electrical Characteristics of the IGBT（Tc= 25℃ unless otherwise specified）:

OFF Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}=0V,I_{CE}=250uA	1200	--	--	V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} =0V,V_{CE}=V_{CES}	--	--	1.0	mA
$I_{GES(F)}$	Gate to Emitter Forward Leakage	V_{GE} =+20V	--	--	+250	nA
$I_{GES(R)}$	Gate to Source Reverse Leakage	V_{GE} =-20V	--	--	-250	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=25A,V_{GE}=15V	--	2.2	2.7	V
$V_{GE(TH)}$	Gate Threshold Voltage	I_C=15mA,V_{CE}=V_{ge}	3.5	5.3	7.5	V

Pulse width tp≤380μs,δ≤2%

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{ies}	Input Capacitance	V_{CE}=30V,V_{GE}=0V f=1MHz	--	2620	--	pF
C_{oes}	Output Capacitance		--	67	--	
C_{res}	Reverse Transfer Capacitance		--	43	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{CE}=600V,I_C=25A V_{GE}=15V, R_g=10Ω Inductive Load	--	41.7	--	ns
tr	Rise Time		--	38.4	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	186.7	--	
t_f	Fall Time		--	369	--	
Eon	Turn-On Switching Loss		--	0.83	2.0	mJ
Eoff	Turn-Off Switching Loss		--	1.03	1.5	
Ets	Total Switching Loss		--	1.86	3.5	
Q_g	Total Gate Charge	V_{CE}=600V,I_C=15A V_{GE}=15V	--	127	180	nC
Q_{ge}	Gate to Emitter Charge		--	14	22	
Q_{gc}	Gate to Collector Charge		--	51	65	

Electrical Characteristics of the DIODE（Tc= 25℃ unless otherwise specified）:

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{FM}	Diode Forward Voltage	I_F=15A	--	1.2	2.7	V
Trr	Reverse Recovery Time	I_F=15A di/dt=200A/uS	--	326	360	ns
Irr	Diode Peak Reverse Recovery Current		--	29	40	A
Qrr	Reverse Recovery Charge		--	4765	6600	uC
Pulse width t tp≤380µs,δ≤2%						

[a1]：Repetitive rating; pulse width limited by maximum junction temperature

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

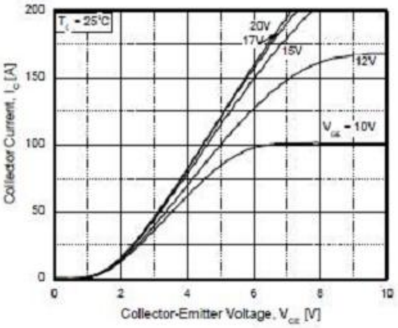


Figure 2. Typical Saturation Voltage Characteristics

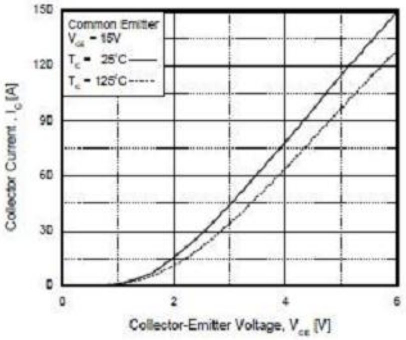


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

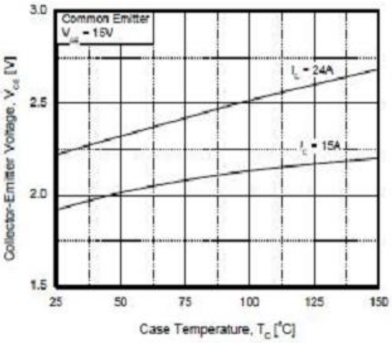


Figure 4. Saturation Voltage vs. VGE

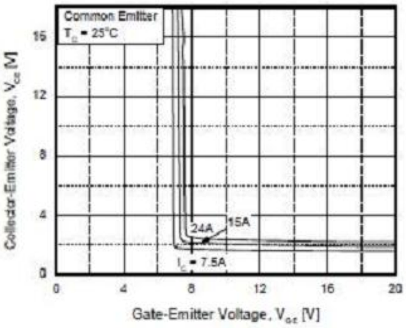


Figure 5. Saturation Voltage vs. VGE

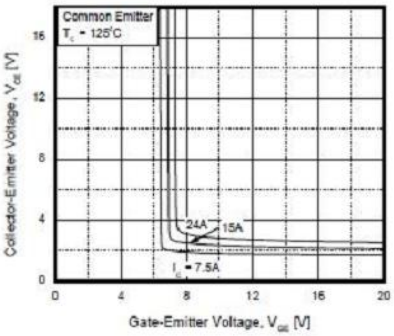
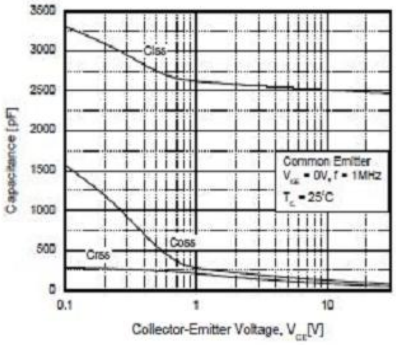
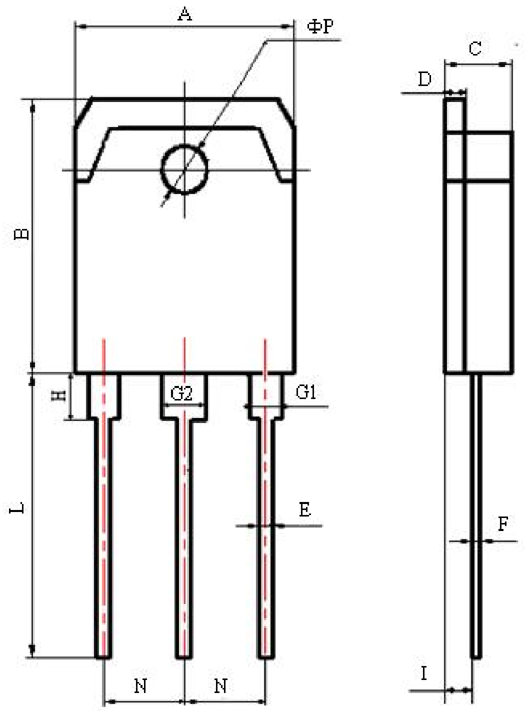


Figure 6. Capacitance Characteristics



Package Information:



Items	Values(mm)	
	MIN	MAX
A	15.10	15.90
B	19.30	20.30
C	4.70	4.90
D	1.40	1.60
E	0.90	1.10
F	0.50	0.70
G1	2.00	2.20
G2	3.00	3.20
H	3.00	3.70
I	1.20	1.60
	2.70	2.90
L	19.00	21.00
N	5.25	5.65
Φ P	3.10	3.30

TO-3P(N) Package

The name and content of poisonous and harmful material in products

Part's Name	Hazardous Substance					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Limit	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
Lead Frame	○	○	○	○	○	○
Molding Compound	○	○	○	○	○	○
Chip	○	○	○	○	○	○
Wire Bonding	○	○	○	○	○	○
Solder	×	○	○	○	○	○
Note	Means the hazardous material is under the criterion of SJ/T11363-2006. Means the hazardous material exceeds the criterion of SJ/T11363-2006. The plumbum element of solder exist in products presently, but within the allowed range of Eurogroup's RoHS.					

Warnings

1. Exceeding the maximun ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximun ratings of the device.
2. When installing the heatsink, please pay attention to the torsional moment and the smoothness of the heatsink.
3. IGBTs is the device which is sensitive to the static electricity, it is necessory to protect the device from being damaged by the static electricity when using it.
4. This publication is made by Huajing Microelectronics and subject to regular change without notice.

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